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11-26-03

Patent
Attorney's Docket No. 009683-357

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	
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Daisaku HORIE	)	Group Art Unit: 2625
	)	
Application No.: 09/531,494	)	Examiner: Yon Jung Couso
	)	
Filed: March 20, 2000	)	Confirmation No.: 5477
	)	
For: IMAGE PROCESSING DEVICE AND IMAGE PROCESSING METHOD FOR CORRECTION OF IMAGE DISTORTION	)	

REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated July 8, 2003, Applicant respectfully requests reconsideration and withdrawal of the rejections of the claims. The allowance of claims 9-11, and the indication that claim 16 contains allowable subject matter, are noted with appreciation. The rewriting of claim 16 in independent form is being held in abeyance, pending consideration of this response.

Claims 1-3, 6 and 17-19 were rejected under 35 U.S.C. §102, on the grounds that they were considered to be anticipated by the *Cullen et al.* patent. In addition, claims 4, 5, 7 and 8 were rejected under 35 U.S.C. §103 in view of the *Cullen* patent and the *Mackinnon et al.* patent. Applicant respectfully submits that the *Cullen* patent neither anticipates, nor otherwise suggests, the subject matter of the rejected claims, whether considered by itself or in combination with the *Mackinnon et al.* reference.

With reference to claim 1, the Office Action states that the *Cullen* patent discloses an image processing device having an image receiving unit to receive original image data. The Office Action further states that the *Cullen* patent teaches an edge detection unit to detect edge data included in the image data relating to the received original image, with specific reference to step 204 in Figure 2c. It is respectfully submitted that neither this step, nor any other portion of the *Cullen* patent, discloses the use of edge detection as the mechanism for determining an inclination angle of received original image data.

Rather, the procedure disclosed in the *Cullen* patent uses a rectangle construction technique to determine the skew angle of an input image. In general, the procedure disclosed in the *Cullen* patent attempts to define a boundary rectangle for each word or sentence in a document. See, for example, column 5, lines 4-12. The rectangle construction technique utilizes black and white pixel data in each scan line of the image. Referring to Figure 3, four consecutive scan lines 300-303 are vertically compressed into a single scan line, e.g. 312, and each byte of the compressed scan line is then horizontally compressed to identify either a black byte or a white byte, as illustrated at 315 and 316.

Thereafter, each compressed scan line is processed for run length extraction, which defines sets of contiguous black pixels in the compressed scan line. Figure 4 illustrates an example of this run length extraction. Referring to Figure 5, successive compressed scan lines are then evaluated to construct rectangles. Basically, each run length of black bits defines a rectangle, and when the run lengths of two successive compressed scan lines overlap one another, they are added to a common rectangle. In essence, therefore, the

technique of the *Cullen* patent defines rectangles by identifying areas of the image in which black pixels are grouped together, as in the case of a word.

Once all of the rectangles have been defined, a skew angle is determined by measuring the offset between associated rectangles. Figure 8a illustrates an example in which the rectangle 802 is offset from the rectangle 801 by an amount that defines a skew angle 805.

From the foregoing, therefore, it can be seen that the procedure disclosed in the *Cullen* patent does not correct for skew by detecting edge data in an image, rotating the detected edge data, deriving a characteristic amount of the rotated edge data, and then determining a skew angle of the original image based on the derived characteristic amount. Rather, the procedure defines rectangles that encompass features of the image, and then determines the skew, or offset, between associated rectangles. To the extent that the technique of the *Cullen* patent utilizes edge information at all, it is only for the purpose of determining which rectangles should be compared to determine the skew angle. There is no disclosure of a procedure in which the edge data is rotated, a characteristic amount is derived from the rotated edge data, and an inclination angle is determined on the basis of this characteristic amount.

For at least this reason, therefore, it is respectfully submitted that the *Cullen* patent does not anticipate the subject matter recited in claims 1-3, 6 and 17-19. Furthermore, it is respectfully submitted that the *Mackinnon et al.* patent does not contain any disclosure which overcomes this fundamental distinction between the *Cullen* patent and the claimed invention. Accordingly, the subject matter of claims 4, 5, 7 and 8 is likewise submitted to

be patentable over the teachings of the *Cullen* patent, even when considered in view of the *Mackinnon* patent.

Claims 12-14 were rejected under 35 U.S.C. §102 on the grounds that they were considered to be anticipated by the *Morimura* patent, and claim 15 was rejected under 35 U.S.C. §103 as allegedly being unpatentable over the *Morimura* patent. It is respectfully submitted that the *Morimura* patent does not anticipate, or otherwise suggest, the subject matter of these claims.

Claim 12 recites an image processing device comprising an image receiving unit, a swing correction unit and a skew correction unit. The rejection of claim 12 states that the *Morimura* patent teaches a swing correction unit to correct distortion of an image caused by the swing of a camera relative to the original image, with particular reference to Figure 16. It is respectfully submitted, however, that neither Figure 16, nor any other portion of the *Morimura* patent, discloses a swing correction unit. In the context of the present invention, the swing of a camera occurs when the optical axis of the camera is not perpendicular to the original being imaged. As illustrated in Figure 13 of the present application, if the original document is parallel to the x-y plane, swing occurs when the camera is rotated about the x axis and/or the y axis. See page 24, lines 1-9. The swing causes the image of an original to be distorted. For instance, a rectangular object would have a trapezoidal appearance, as depicted in Figure 15.

The flow chart depicted in Figure 16 of the *Morimura* patent has nothing to do with the correction of this type of distortion. Rather, Figure 16 illustrates an operation for controlling a zoom lens, so as to provide an optimum enlargement ratio. Referring to

Figure 17 of the patent, the objective of the process disclosed in Figure 16 is to maximize the amount of the image that is filled by the document 1a, and minimize the amount of background area 1 that appears in the image. This objective is achieved by setting the zoom lens of the camera at an appropriate magnification ratio. This setting does not correct for, or otherwise have anything to do with, camera swing.

From the foregoing, it can be seen that the *Morimura* patent does not disclose, among other elements, a swing correction unit to correct distortion of an image caused by the swing of a camera with respect to the original image. In fact, since the *Morimura* patent discloses that the camera is mounted on a fixed stand, camera swing is likely not even a concern in the disclosed arrangement. For at least these reasons, therefore, it is respectfully submitted that the *Morimura* patent does not anticipate, nor otherwise suggest, the subject matter of claims 12-15.

It is respectfully submitted that all pending claims are patentably distinct from the cited references. Reconsideration and withdrawal of the rejections are therefore respectfully requested.

Respectfully submitted,
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Date: November 14, 2003

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